

What is Claimed is:

- [c1] An epoxy hardener composition having a cure temperature of between about 60–100°C, comprising a mixture of: a) one of imidazole and a trihydric compound having methylol groups at the 2- and 6- positions formed by reacting a 4-alkyl phenol with 2 moles of formaldehyde; b) trimethylolpropane; and c) one of tetramethylguanadine and tetramethylguanadine adduct.
- [c2] An epoxy hardener composition according to claim 1, wherein component a) of the mixture is imidazole.
- [c3] An epoxy hardener composition according to claim 2, further comprising an accelerator for decreasing the curing time.
- [c4] An epoxy hardener composition according to claim 2, wherein the trimethylolpropane is a mixture of trimethylolpropane with a component selected from the group consisting of bisphenols, dihydric phenols, adduct of a bisphenol with 1–2 moles of a monoglycidyl compound, adduct of a dihydric phenol with 1–2 moles of a monoglycidyl compound, adduct of a diglycidyl compound with 2 moles of a dihydric phenol, adduct of trimethylolpropane with 2 moles of a monoglycidyl compound, adduct of a 4-alkyl phenol with 1 mole diethanolamine and one mole formaldehyde, adduct of a 4-alkyl phenol with 1 mole N,N(diethylamino)-3-propylamine and one mole formaldehyde, trimethylolpropane, adduct of trimethylolpropane with 1 mole of a monoglycidyl compound, adduct of a bisphenol with 2 moles of trimethylolpropane, adduct of a dihydric phenol with 1–3 moles of trimethylolpropane, adduct of 0-cresyl glycidylether with 2 moles of trimethylolpropane, adduct formed by first reacting trimethylolpropane with 2 moles of 0-cresyl glycidylether followed by reacting additional 2 moles of trimethylolpropane, adduct of a diglycidyl compound with 2 moles of a monohydric phenol capable of ring substitution, followed by reaction with 2 moles of trimethylolpropane, adduct of a monoglycidyl compound with 1 mole of a monohydric phenol capable of ring substitution followed by reacting 1 mole of trimethylolpropane, trihydric compound formed by reacting a 4-alkyl phenol with 2 moles of formaldehyde to produce methylol groups at the 2- and 6- positions, and 2-ethyl-4-

methylimidazole.

- [c5] An epoxy hardener composition according to claim 3, wherein the accelerator is a phenolic hardener.
- [c6] An epoxy hardener composition according to claim 5, wherein the phenolic hardener is one of an adduct formed by reacting 1 mole p-cresol, 1 mole diethanolamine and 1 mole formaldehyde, and an adduct formed by reacting 1 mole p-cresol, 1 mole diethylaminopropylamine and 1 mole formaldehyde.
- [c7] An epoxy hardener composition comprising a mixture of a tertiary amine, imidazole and a methylol-functional compound.
- [c8] An epoxy hardener composition according to claim 7, wherein the imidazole, tertiary amine, and methylol-functional compound are present in molar ratios between 2:1:1 and 1:2:1.
- [c9] An epoxy hardener composition according to claim 7, wherein the tertiary amine is one of tetramethylguanidine and tetramethylguanidine adduct.
- [c10] An epoxy hardener composition according to claim 8, wherein the methylol-functional compound is trimethylolpropane.
- [c11] An epoxy hardener composition according to claim 10, further comprising an accelerator for decreasing the curing time.
- [c12] An epoxy hardener composition according to claim 11, wherein the accelerator is a phenolic hardener.
- [c13] An epoxy hardener composition according to claim 9, wherein the methylol-functional compound comprises a mixture of trimethylolpropane and a component selected from the group consisting of bisphenols, dihydric phenols, adduct of a bisphenol with 1-2 moles of a monoglycidyl compound, adduct of a dihydric phenol with 1-2 moles of a monoglycidyl compound, adduct of a diglycidyl compound with 2 moles of a dihydric phenol, adduct of trimethylolpropane with 2 moles of a monoglycidyl compound, adduct of a 4-alkyl phenol with 1 mole diethanolamine and one mole formaldehyde, adduct of

a 4-alkyl phenol with 1 mole N,N(diethylamino)-3-propylamine and one mole formaldehyde, trimethylolpropane, adduct of trimethylolpropane with 1 mole of a monoglycidyl compound, adduct of a bisphenol with 2 moles of trimethylolpropane, adduct of a dihydric phenol with 1-3 moles of trimethylolpropane, adduct of 0-cresyl glycidylether with 2 moles of trimethylolpropane, adduct formed by first reacting trimethylolpropane with 2 moles of 0-cresyl glycidylether followed by reacting additional 2 moles of trimethylolpropane, adduct of a diglycidyl compound with 2 moles of a monohydric phenol capable of ring substitution, followed by reaction with 2 moles of trimethylolpropane, adduct of a monoglycidyl compound with 1 mole of a monohydric phenol capable of ring substitution followed by reacting 1 mole of trimethylolpropane, trihydric compound formed by reacting a 4-alkyl phenol with 2 moles of formaldehyde to produce methylol groups at the 2- and 6-positions, and 2-ethyl-4-methylimidazole.

[c14]

An epoxy hardener composition according to claim 7, wherein the methylol-functional compound is a mixture of trimethylolpropane with a component selected from the group consisting of bisphenols, dihydric phenols, adduct of a bisphenol with 1-2 moles of a monoglycidyl compound, adduct of a dihydric phenol with 1-2 moles of a monoglycidyl compound, adduct of a diglycidyl compound with 2 moles of a dihydric phenol, adduct of trimethylolpropane with 2 moles of a monoglycidyl compound, adduct of a 4-alkyl phenol with 1 mole diethanolamine and one mole formaldehyde, adduct of a 4-alkyl phenol with 1 mole N,N(diethylamino)-3-propylamine and one mole formaldehyde, trimethylolpropane, adduct of trimethylolpropane with 1 mole of a monoglycidyl compound, adduct of a bisphenol with 2 moles of trimethylolpropane, adduct of a dihydric phenol with 1-3 moles of trimethylolpropane, adduct of 0-cresyl glycidylether with 2 moles of trimethylolpropane, adduct formed by first reacting trimethylolpropane with 2 moles of 0-cresyl glycidylether followed by reacting additional 2 moles of trimethylolpropane, adduct of a diglycidyl compound with 2 moles of a monohydric phenol capable of ring substitution, followed by reaction with 2 moles of trimethylolpropane, adduct of a monoglycidyl compound with 1 mole of a monohydric phenol capable of ring

substitution followed by reacting 1 mole of trimethylolpropane, trihydric compound formed by reacting a 4-alkyl phenol with 2 moles of formaldehyde to produce methylol groups at the 2- and 6- positions, and 2-ethyl-4-methylimidazole.

- [c15] An epoxy hardener composition according to claim 7, further comprising an accelerator for decreasing the curing time.
- [c16] An epoxy hardener composition according to claim 15, wherein the accelerator is a phenolic hardener.
- [c17] An epoxy hardener composition according to claim 16, wherein the phenolic hardener is one of an adduct formed by reacting 1 mole p-cresol, 1 mole diethanolamine and 1 mole formaldehyde and an adduct formed by reacting 1 mole p-cresol, 1 mole diethylaminopropylamine and 1 mole formaldehyde.
- [c18] An epoxy hardener composition according to claim 1, wherein the tetramethylguanidine adduct is a reaction product of tetramethylguanidine and a diglycidylether.
- [c19] An epoxy hardener composition according to claim 9, wherein the tetramethylguanidine adduct is a reaction product of tetramethylguanidine and a diglycidylether.
- [c20] An epoxy hardener composition according to claim 1, wherein component a) of the mixture is the trihydric compound having methylol groups at the 2- and 6- positions formed by reacting a 4-alkyl phenol with 2 moles of formaldehyde.
- [c21] An epoxy hardener composition according to claim 20, wherein the trihydric compound is 2, 6-bis(hydroxymethyl)-p-cresol.